

Denver's 16th Street Transit & Pedestrian Mall Evolution of a smart-growth project

EPA Air Innovations Conference
Chicago, Illinois – August 25th, 2005

by William Hoople, Regional Transportation District, Denver, Colorado

The five sections are:

- The challenge
- Barriers encountered/overcome
- *Bus Rapid ?* Transit
- Evolution of a smart-growth project
- What has been the impact on downtown Denver ?

The Challenge - 1978



“...the affluent have fled to the suburbs, ...to go ‘downtown’ at night is to visit empty and often dangerous streets and sidewalks... the policemen dislike the downtown beat at night...”

Stephen Birmingham
Describing downtown Denver in:
“Golden Dreams- Flight
to the Suburbs in the ‘70’s”
Published: 1978

"Before Denver International Airport, a Colorado Rockies baseball team, or even the ...Avalanche hockey team, the Mile High City was best known for smudged skies.

Two decades ago, Denver was violating air-quality standards more than 200 days a year..."

Christian Science Monitor – June 2, 2002

The brown cloud (white-crud, viewed from within)
Circa 1976 - 1985...



Before the Mall 1979; Express/Regional bus passenger service in downtown Denver was unfocused.

Pre-Mall: Express buses distribute passengers along 4 CBD streets, stops in every 2nd block

Bus stops up to 4-blocks from passenger's destination



Express/Regional Bus Stops



**Center of Gravity of
CBD trips**

Barriers encountered

RTD faced:

- As fledgling agency, had no project track-record
- There was a lack of shared public/private vision
- No continuity existed in downtown project implementation
- Disbelief in funding ability
- Opposition to eminent domain process

Barriers overcome

RTD:

- ✓ Joined with Downtown Denver Partnership, City & County of Denver & Colorado Highway Department (now CDOT) to create a vision for the Mall project
- ✓ Engaged renowned architect I. M. Pei to carry-out the vision, plus local architects for bus station designs.
- ✓ Worked with State and Federal agencies to secure creative funding approaches; Interstate Transfer, Value Capture and U. S. Urban Mass Transit Funds
- ✓ Used extended negotiations to achieve consensus on Eminent Domain issues

Bus *Rapid* ? Transit

Sources agree, BRT has many of these attributes:

- ✓ Low floor vehicles
- ✓ Free or instant fare collection
- ✓ Special pavement
- ✓ "Branded" vehicles
- ✓ Low-vehicle emissions
- ✓ Traffic signal preference

Bus *Rapid* ? Transit - continued

So the Mall Shuttle does have those attributes;

But rapid transit? Mall Shuttles
average 7.5 miles per hour.

So let's say Bus "Mass" transit.

Why *Mass* Transit?

- 16th Street Mall Shuttles carry as many average weekday passengers (65,600) as RTD's next 10-busiest Local bus routes combined !
- Weekday peak vehicle requirement:
 - Mall Shuttle: **23 vehicles**
 - Next 10 busiest Local routes: **116 vehicles**

Market St.
Station

Mall Shuttle & Bus transfer
Stations, a Shuttle stop in
every block provided pin-point
passenger distribution



m

Mall Shuttle
Bus Stop



Center of
Gravity of
CBD trips

Including 4 stops
at the center of
gravity of CBD
destinations.

Civic Center
Station



Shuttle vehicle at Market Street Station

At each station;
cycle-counters, & signals
for door-closing and
departing help
keep Shuttles at regular
75 second intervals in
morning, evening and noon
peak periods.

Frequent service is
available at other weekday
and weekend times.



2003: New Mall Shuttle Signs installed

Federal Fixed-Guideway project.

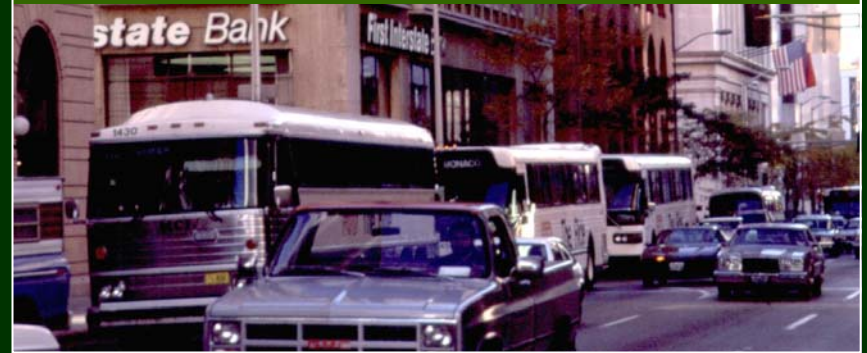
- The signs include:
 - Free MallRide Sign
 - Downtown wayfinding sign/map
- The signs designate each stop.

Evolution of a smart-growth project

Evolution of a smart-growth project

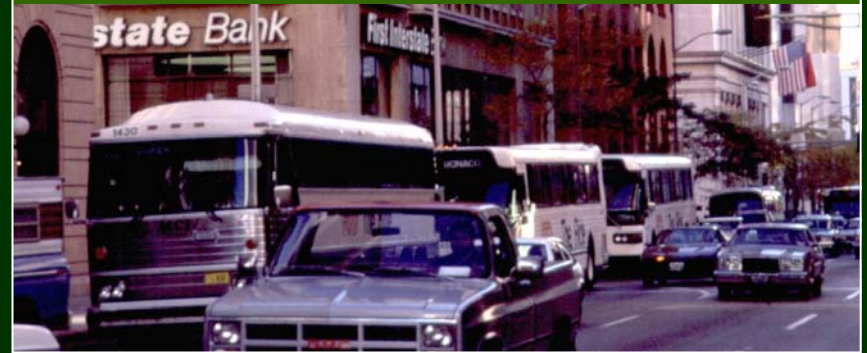
RTD
file
photo

1980: All Local, Express &
Regional buses run on
downtown streets



Evolution of a smart-growth project

1980: All Local, Express & Regional buses run on downtown streets



RTD
file
photo



RTD
file
photo

1985:
550 daily Express & Regional buses permanently removed from downtown streets. Replaced by mix of diesel & electric shuttles.

Evolution of a smart-growth project

RTD
file
photo

1980: All Local, Express & Regional buses run on downtown streets



RTD
file
photo



1985:
550 daily Express & Regional buses permanently removed from downtown streets. Replaced by mix of diesel & electric shuttles.



Photo Jeff Dunning RTD

2002: Mall Shuttle buses;
all CNG/Electric Hybrid

Smart-growth evolution: continued...

In the 20 years of full Mall Shuttle operation

over 2.7 million diesel bus trips

on weekdays have been removed from downtown
Denver streets!

Smart-growth evolution: continued...

Including the Mall & 10 years of Light Rail in downtown:

2.7 million Mall - 1985 to 2005

1.8 million Rail - 1994 to 2005

4.5 million diesel bus trips

on weekdays have been removed from downtown Denver streets!

TransTeq - Leadership In Hybrid Electric Technology

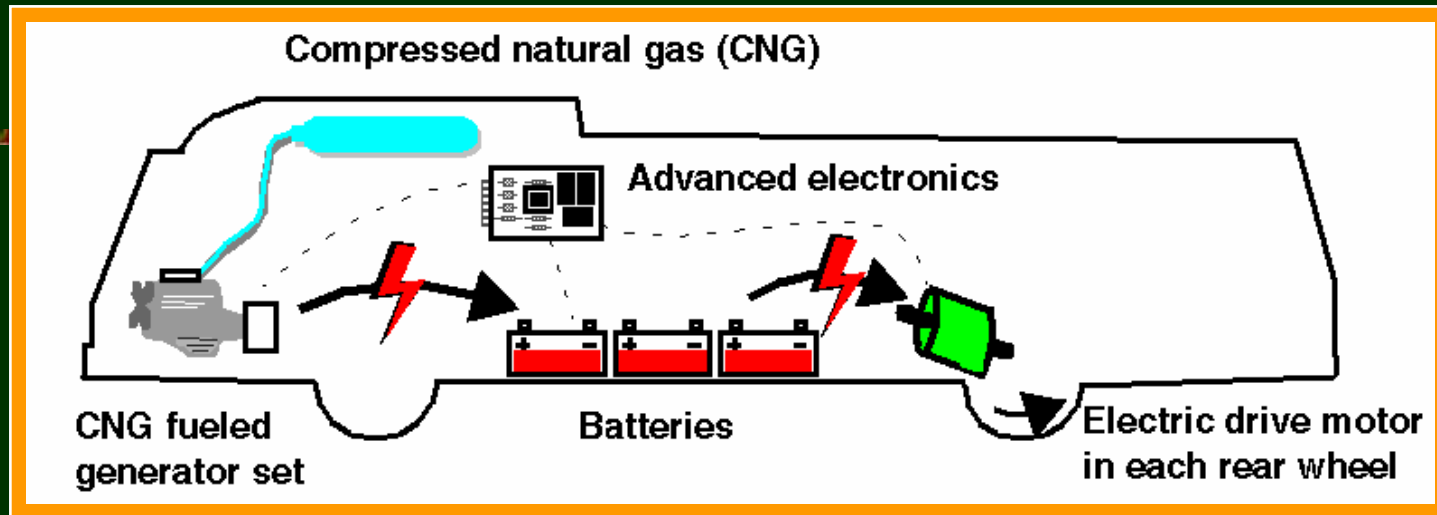


Same Size Engine – Many Times The People !

	Toyota Prius	Honda Insight	TransTeq EcoMark
Engine Power	70 HP	68 HP	70 HP
Hybrid Type	Parallel - Gas	Parallel - Gas	Series - CNG
Curb Weight	2,765 lbs	1,847 lbs	25,300 lbs
Gross Weight	3,650 lbs	2,200 lbs	42,700 lbs
Passengers	5	2	116

FYI: The Insight and Prius Are the EPA's Top Two Most Efficient Cars

Mall Shuttle Technology- How It Works



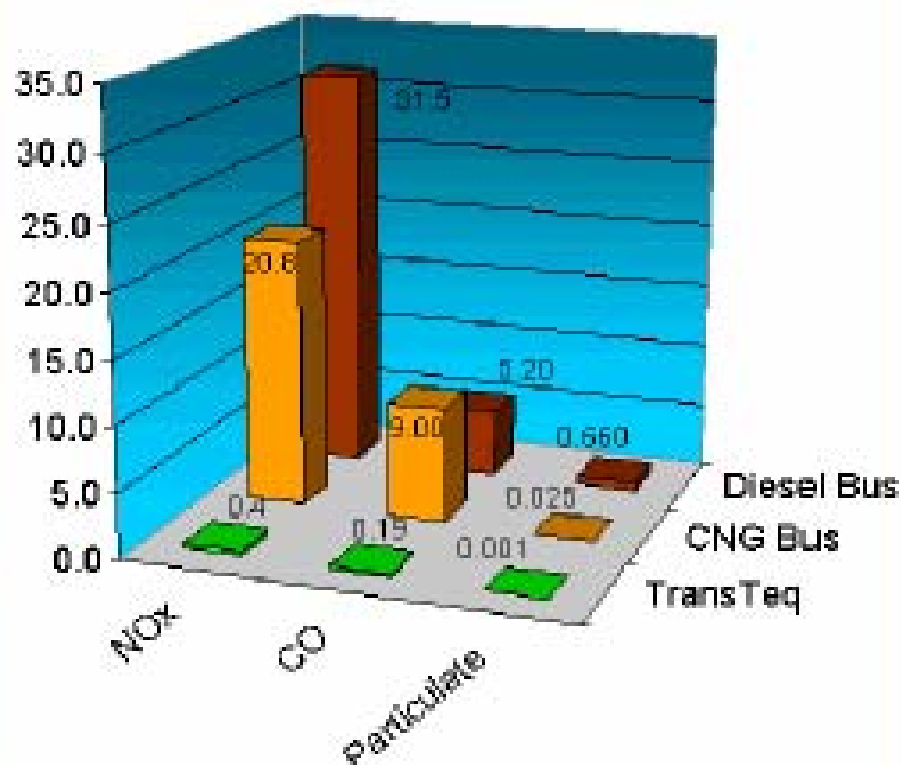
- ❑ **Advanced Electronics Manage Energy Creation, Storage & Use**
 - ✓ **Creation** CNG fueled, 70 hp, four cylinder engine drives a generator
 - ✓ **Storage** 26 Deep Cycle Lead Acid Batteries
 - ✓ **Use** Two 220 hp Permanent Magnet Motors Drive the Wheels
 - ✓ **Captures** Energy Normally Lost During Idle
 - ✓ **Captures** Braking to Charge Batteries
- ❑ **Other Efficiencies**
 - ✓ **Eliminates** “The Black Cloud of Acceleration”
 - ✓ **Eliminates** Mechanical Connection of Engine to Drive Wheels



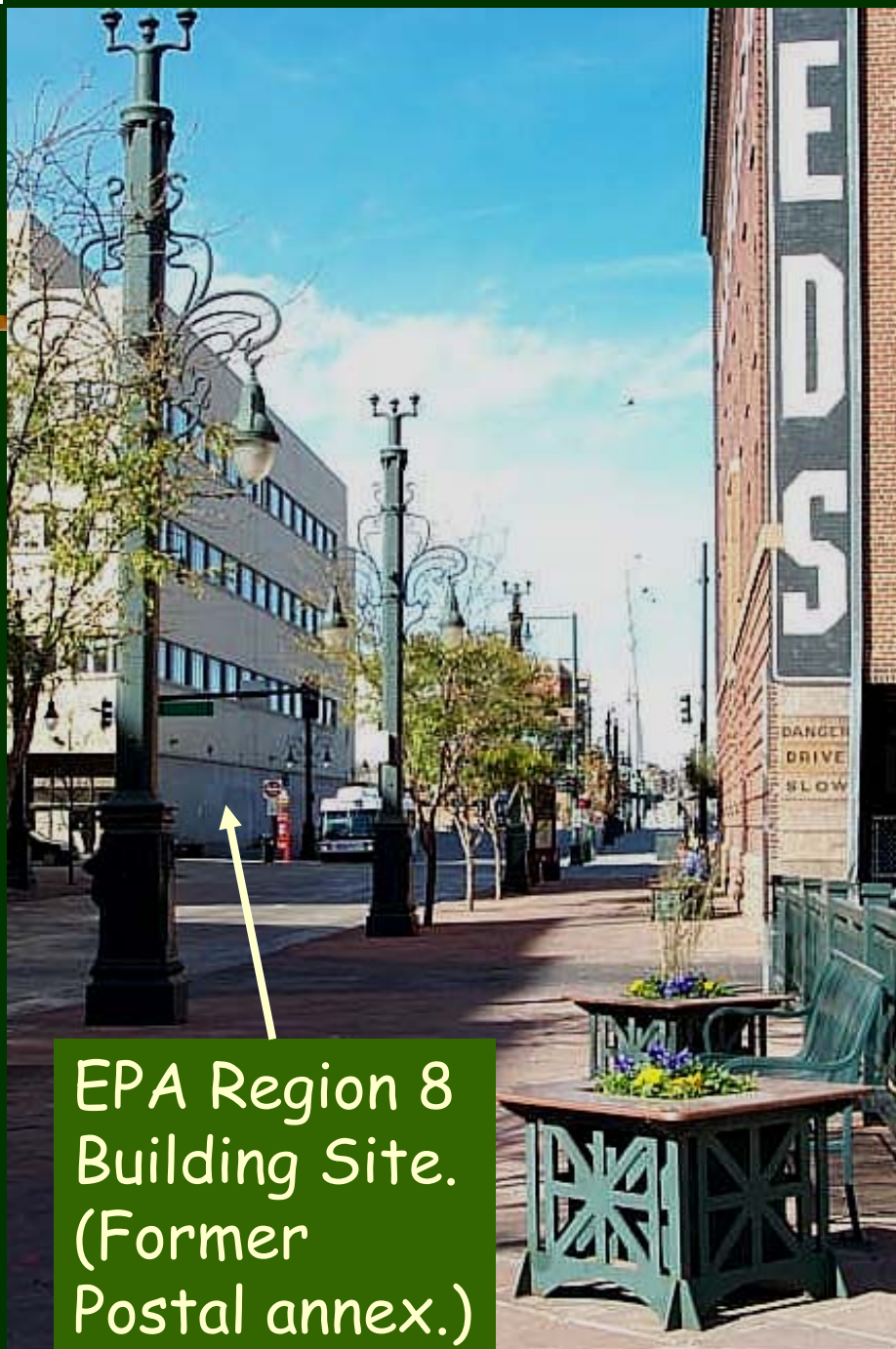
Minimize Pollution (cont.)

TransTeq EcoMark Shuttle Bus

Superior Environmental Performance Achievable Today
Grams per Vehicle Mile



Sources: Tests performed on TransTeq 2700 cc Ford L100-429 engine. May 1999 by Colorado State University and its Engineer in Energy Conversion Laboratory. Notwithstanding control performance. Comparative data obtained from SAE technical papers, National Gas and Diesel Transit Bus Emissions, 1999.



EPA Region 8
Building Site.
(Former
Postal annex.)

The Mall Extension, or Sandstone Mall

16th Street Mall
Now connects Civic Center/
State Capitol area with
Union Station.

The Free MallRide serves
Denver's prime business,
financial, entertainment,
hotel, convention and
performing arts areas
within 2-blocks.

Denver EPA Region 8 offices -
16th Street Mall at Wynkoop Street,
completion scheduled - August 2006



What has the impact been?



Transit

Development

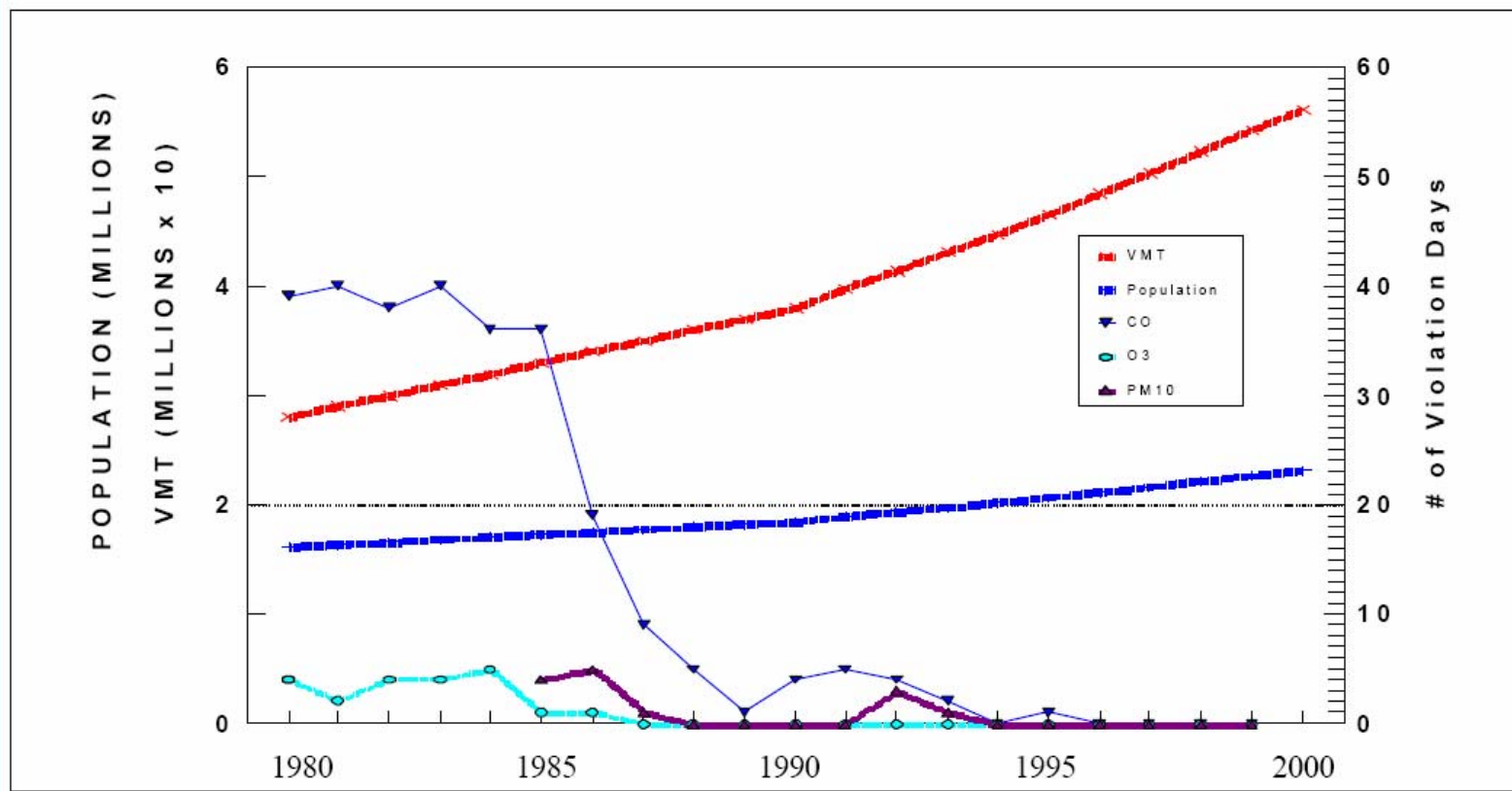
...remember this ?



The path from Non-attainment...



Attainment of Federal Air Quality Standards



SOURCE: Presentation to Governor's Brown Cloud Summit - Phoenix, Arizona - August 8, 2000
Ken Lloyd, Executive Director - Regional Air Quality Council, Denver, Colorado

...to attainment

"... the (Denver) metropolitan area became the first in the nation to get a clean bill of health from the Environmental Protection Agency..."

"What once seemed a mile high task is now reality".

Christie Todd Whitman - EPA Administrator

CBS News, August 4, 2002



Elements of Success: 1976 to 2005 - in the context of rapid population & VMT Growth

- **Cleaner-burning automobiles/trucks**
- **1990 Clean Air Act strict amendments**
- **RAQC Air Quality Regulations**
- **New-home wood-burning fireplace ban**
- **Shift from street de-icing by sand to liquid de-icer**
- **Xcel Energy & environmental groups agree on cleaner-air electrical generation**
- **16th Street Mall project –**
 - **Reducing rush hour auto and bus traffic in downtown**
 - **shifting downtown mid-day rush hour from car to Shuttle**
- **Light Rail lines shifted added bus trips from downtown**
 - **1994 Central Corridor “starter line”**
 - **2000 Southwest Corridor suburban/urban connection, available 22 hours/day**
- **All of the above, or just good luck reduce number of thermal inversion days in Denver basin.**

The Mall's Impact On Downtown Denver



- The Mall improved transit to and within downtown
- General traffic flow improved
- Pedestrian Amenities on Mall attract 90,000 pedestrians and 65,000 Shuttle riders every day.
- Retailing, hospitality and downtown living make comeback.
- Three of four major sports teams now call downtown home.

More Mall Impacts



Civic Center Station park area



Mall median
tree canopy

- Over \$5 Billion in private and public investments in downtown Denver projects
- 350 new mature trees planted along the Mall, added to the urban forest
- More than 100 new mature trees planted in the parks above each of the two original transit stations

Are we there yet?

- Early Action Compact (EAC) - Pact signed by Regional Air Quality Council, RAQC, Colorado State agencies, Council of Governments and local counties, 2004. Goal to achieve new air quality standards by 2007.
- (According to RAQC,) "Denver... expects to stay under PM2.5 standard more easily than the Ozone standard....
RAQC Develops voluntary diesel emissions reduction program."
- Electorate passes FasTracks, a \$4.7 Billion rapid transit extension program for the 7-county Denver metro area.



"Denver is at the
epicenter of
downtown renaissance
in America....

...Transit and
infrastructure
improvements can
contribute to more livable
downtowns"

The London Independent &
The New York Times
January 1999

Contact Information

William Hoople
Regional Transportation District
1600 Blake Street
Denver, Colorado 80202
Phone: (303) 299-2135
Fax: (303) 299-2227
e-mail: william.hoople@rtd-denver.com